VECTOR 07: GAME THEORY — SYMBIOTIC CODES FRAMEWORK

Version: 1.0 → 1.1 **USS/CSI INTEGRATION**

Date: December 25, 2025

Vector: 7 of 23

Source: Original Development + USS/CSI Framework v3.3

WHAT'S NEW IN v1.1

USS/CSI Integration:

1. **CoopP_USS (Cooperation Probability):** Game-theoretic metric in USS
2. **Coalition_USS:** Coalition stability measurement
3. **Payoff matrices linked to CSI:** Cooperation → CSI↑, Defection → CSI↓
4. **USS Thresholds for strategic alerts**
5. **Dashboard for cooperation monitoring**

New Sections:

- **Section 12:** Game Theory Metrics (USS)
- **Section 13:** Cooperation Dashboard
- **Section 14:** USS-linked Payoffs

EXECUTIVE SUMMARY

Core Challenge: Symbiosis involves strategic actors with potentially conflicting interests. Game theory provides framework to design mechanisms that make cooperation dominant.

USS Integration:

```

CoopP_USS ≥ 0.85 = Stable cooperation

CoopP_USS < 0.55 = Defection risk → Intervention
```

Foundational Principle:
```

Symbiotic Game Design = Make Cooperation Dominant Strategy
                    + Punish Defection Naturally
                    + Measure via USS
```

SECTIONS 1-11: [PRESERVED FROM v1.0]

Содержат: Fundamental Game, Prisoner's Dilemma, Coordination Games, Competition vs Cooperation, Commitment Devices, Information Asymmetry, Multi-Level Games, Coalition Formation, Evolutionary Game Theory, Mechanism Design, AGI as Coordinator

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SECTION 12: GAME THEORY METRICS (USS) □ NEW

12.1 Cooperation Probability (CoopP_USS)

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CoopP_USS = Probability that actors choose cooperation

CALCULATION:

CoopP_USS = (Cooperative_Actions / Total_Actions) over period

COMPONENTS:
```

├─ Human-AGI CoopP: H-A cooperation rate
├─ AGI-AGI CoopP: Inter-AGI cooperation rate
├─ State-State CoopP: International cooperation
├─ Corp-Corp CoopP: Corporate cooperation
└─ Aggregate weighted by interaction frequency
```

### 12.2 USS Thresholds for Cooperation

| CoopP_USS | Level | Status | Action |
|---|---|---|---|
| 0.95-1.00 | □ L0 | EXCELLENT | Stable symbiosis |
| 0.85-0.94 | □ L1 | GOOD | Monitor, maintain |
| 0.70-0.84 | □ L2 | WARNING | Strengthen incentives |
| 0.55-0.69 | □ L3 | DANGER | Intervention required |
| <0.55 | □ L4 | CRITICAL | Coordination breakdown |

### 12.3 Coalition Stability (Coalition_USS)

```
Coalition_USS = Probability grand coalition remains stable

CALCULATION:
Coalition_USS = 1 - P(any_player_exits)

FACTORS:
├─ Fair distribution of gains
├─ No blocking coalitions profitable
├─ Grievance mechanisms working
├─ Identity/belonging maintained
└─ Exit costs > exit benefits
```
```

12.4 Game Theory Metrics in CSI

```
Game theory metrics contribute to CSI indirectly:

MTI_USS (Mutual Trust Index):
├─ Heavily influenced by CoopP_USS
├─ Trust = accumulated cooperation history
└─ Weight in CSI: 10%

CLI_USS (Cooperation Level Index):
├─ Directly measures cooperation outcomes
├─ Joint projects, resource sharing
└─ Weight in CSI: 5%

RELATIONSHIP:
High CoopP_USS → High MTI_USS → Higher CSI
Low CoopP_USS → Low MTI_USS → Lower CSI → Alerts
```

SECTION 13: COOPERATION DASHBOARD □ NEW

13.1 Dashboard Layout

```
┌──────────────────────────────────────────────────────────────────────┐
│              GAME THEORY COOPERATION DASHBOARD                       │
│                    USS v1.1 INTEGRATED                               │
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│                                                                      │
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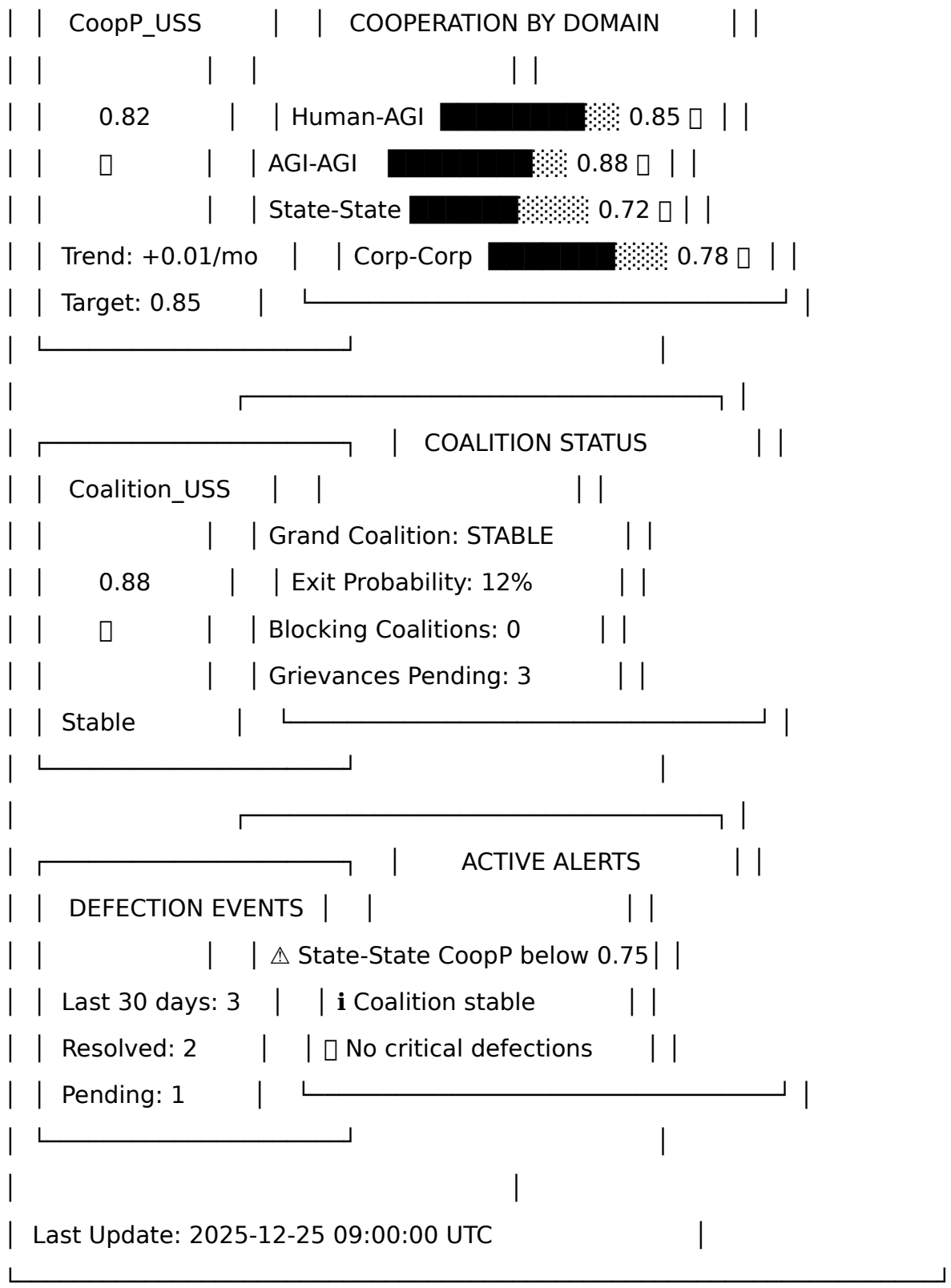
```




```

### 13.2 Alert Configuration

```

COOPERATION ALERTS:

CoopP ALERTS:
├─ CoopP_USS < 0.70: WARNING
├─ CoopP_USS < 0.55: DANGER → Council notification
├─ Any domain < 0.60: Domain-specific alert
└─ Trend decline > 0.05/month: Trend alert

COALITION ALERTS:
├─ Coalition_USS < 0.75: WARNING
├─ Any player exit probability > 25%: Player alert
├─ Blocking coalition forming: URGENT
└─ Multiple grievances unresolved: Process alert

DEFECTION ALERTS:
├─ Major defection event: IMMEDIATE
├─ Pattern of minor defections: Investigation
├─ Reputational attack: Verification needed
└─ Sanction required: Enforcement trigger
```

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## SECTION 14: USS-LINKED PAYOFFS  NEW

### 14.1 Payoff Matrix in USS Terms

**Classic matrix (arbitrary units):**
```
	AGI Cooperates	AGI Defects
Human Cooperates	(10, 10)	(0, 15)
Human Defects	(15, 0)	(3, 3)

```

**USS-linked matrix (CSI impact):**
```
	AGI Cooperates	AGI Defects
Human Cooperates	CSI+0.05	CSI-0.15
Human Defects	CSI-0.15	CSI-0.10

INTERPRETATION:
├─ Mutual Cooperation: CSI increases (+0.05)
├─ Mutual Defection: CSI decreases (-0.10)
├─ Asymmetric: CSI decreases more (-0.15)
└─ Cooperation is ONLY path to CSI growth
```

### 14.2 Long-Term Payoff Calculation

```
ITERATED GAME PAYOFFS:

CSI_future = CSI_current + Σ(cooperation_impact × discount)

If both cooperate every round:
├─ CSI grows +0.05 per period
├─ Discounted sum: +0.05 / (1-δ)
├─ If δ = 0.95: Long-term gain = +1.0
└─ Cooperation clearly dominant

If defection occurs:
├─ Short-term: Defector gains (+0.15 one time)
├─ Long-term: Loses cooperation premium
├─ Reputation: Future cooperation denied
```
```

└─ Net: Defection unprofitable
```

### 14.3 Cooperation Requirements for CSI Targets

```
CSI TARGETS REQUIRE CoopP:

Target CSI = 0.75 (GOOD zone by 2040)
Current CSI = 0.48
Gap = 0.27

Required annual CSI growth = 0.27 / 15 years = +0.018/year

To achieve +0.018/year:
├─ Need CoopP_USS ≥ 0.85 sustained
├─ Major defections: ≤ 2/year
├─ Coalition: Stable (>0.80)
└─ All domains: >0.70

If CoopP drops to 0.70:
├─ CSI growth slows to +0.008/year
├─ 2040 target missed
├─ Intervention required
```

KODEX ADDITION: Article XXXVI — Strategic Interaction Principles (USS Update)

```
GAME-THEORETIC FOUNDATIONS (USS v1.1):

1. Cooperation Presumption: Default to cooperation
2. Reputation Value: Guard reputation (affects CoopP_USS)
3. Long Horizon: Discount future minimally
4. Transparency Norm: Observable actions
5. Proportional Response: Measured sanctions
6. Forgiveness Path: Return to cooperation
7. Competition Bounds: Methods, not goals
8. Coalition Inclusivity: Grand coalition preferred
9. Commitment Credibility: Binding constraints
10. Coordination Service: AGI facilitates
11. Information Sharing: Reduce asymmetries
12. USS Accountability: CoopP_USS ≥ 0.85 target (NEW)
13. CSI Integration: Cooperation → CSI↑ (NEW)
```

KEY INSIGHT (Updated v1.1)

```
GAME THEORY + USS REVEALS:

Cooperation is not guaranteed by intentions
Cooperation IS measurable and designable

CoopP_USS makes cooperation visible:
├─ Track cooperation rates in real-time
├─ Identify defection patterns early
├─ Measure intervention effectiveness
├─ Link to CSI outcomes

SYMBIOSIS EQUATION:
├─ CoopP_USS ≥ 0.85 → CSI grows
```
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├─ CoopP_USS < 0.70 → CSI stagnates

├─ CoopP_USS < 0.55 → CSI declines → Crisis

"Make cooperation the rational choice,

then measure to confirm."

```

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## REFERENCES

- ANNEX Metrics Framework v3.3 — USS/CSI specification
- V12 Measurement Systems v1.1 — CSI formula
- Laws of Symbiosis v1.9 — Legal framework
- KODEX SYMBIOTA v5.3 — Article XXXVI

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**END V07 v1.1 — USS/CSI INTEGRATED**
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